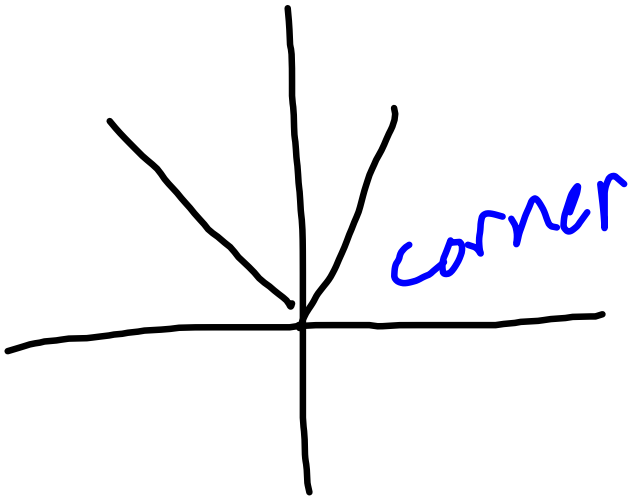
3.2 differentiable

f is differentiable at $x=c$

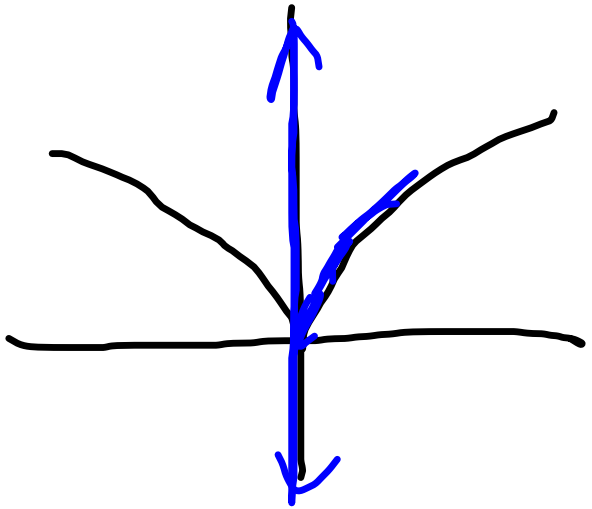
means: f has a der. at $x=c$



diff. at $x=0$?

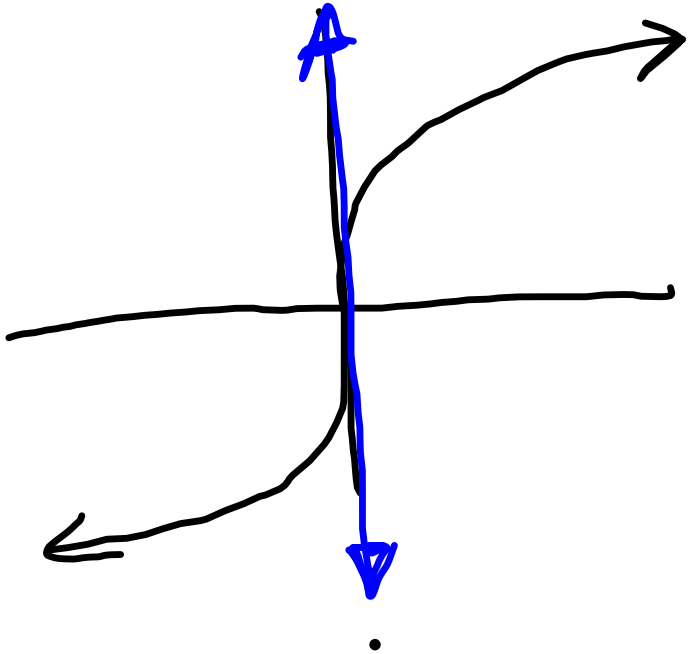
no

left. der $=-1$ right der $=1$



too pointy

cusp



no slope of tan line dne (∞)

Thm 1 p 113

If f is diff. at $x=a$

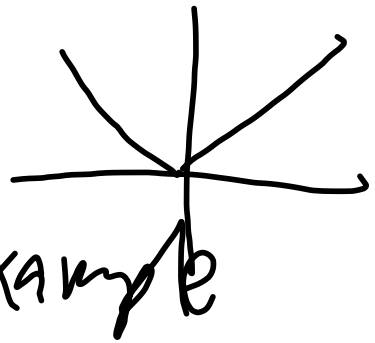
then f is cont. at $x=a$

do not assume the converse

If f is cont at $x=a$

then is f diff at $x=a$?

not always

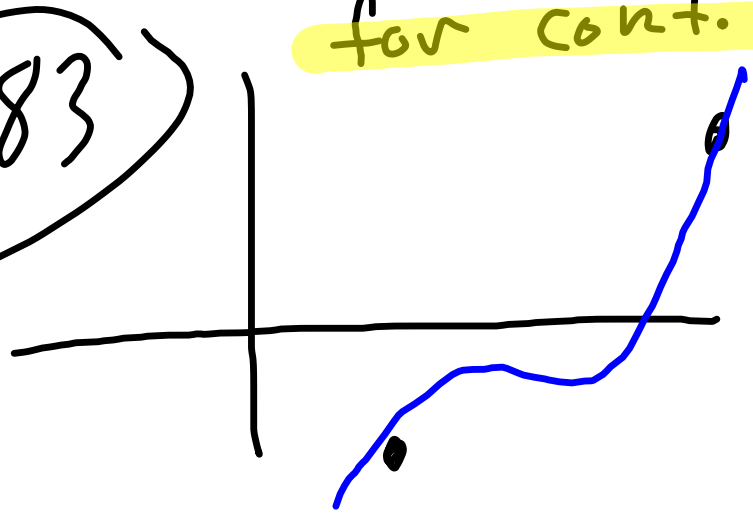


counterexample

Intermediate value theorem

for cont. functions

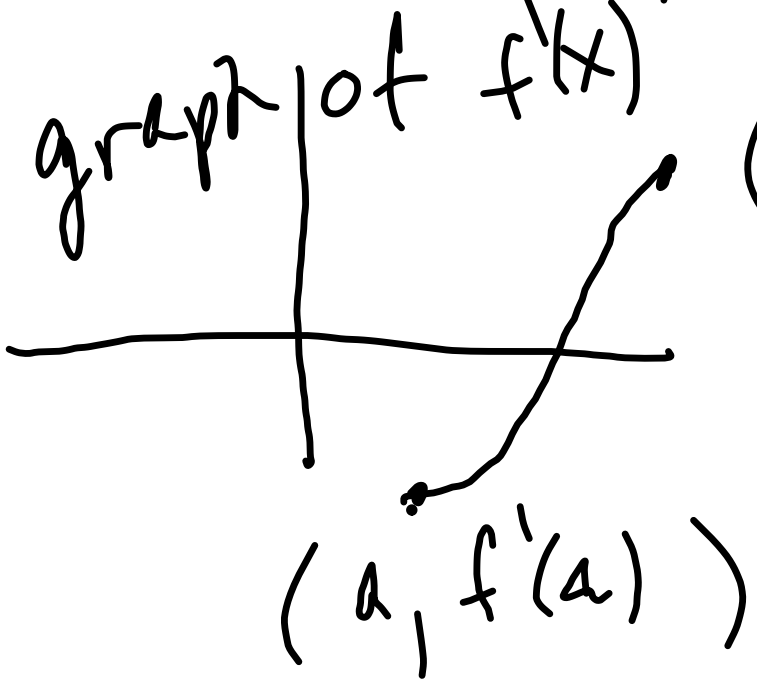
p 83



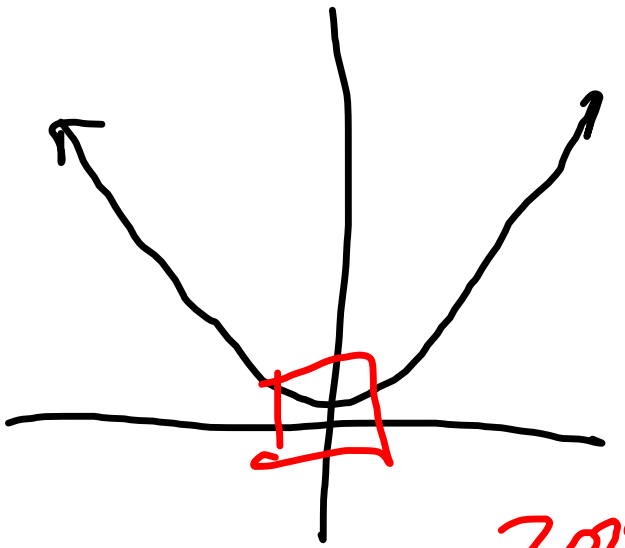
f is cont. on $[a,b]$

f(x) takes on every value between f(a) and f(b)

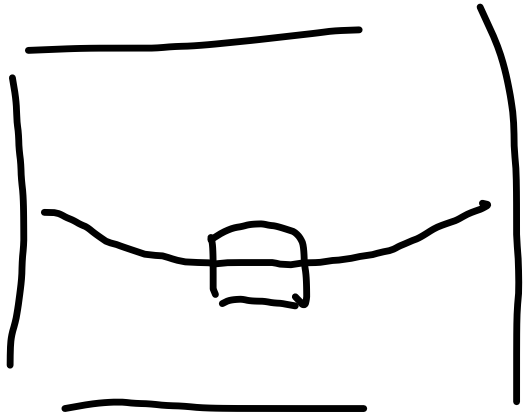
p 113 Intermediate value thm for derivatives



$f'(x)$ takes on every value between $f'(a)$ & $f'(b)$



Zoom



local linearity

diff. functions

numerical derivative

NDER

find der of $y = \ln x$

at $x = 2$

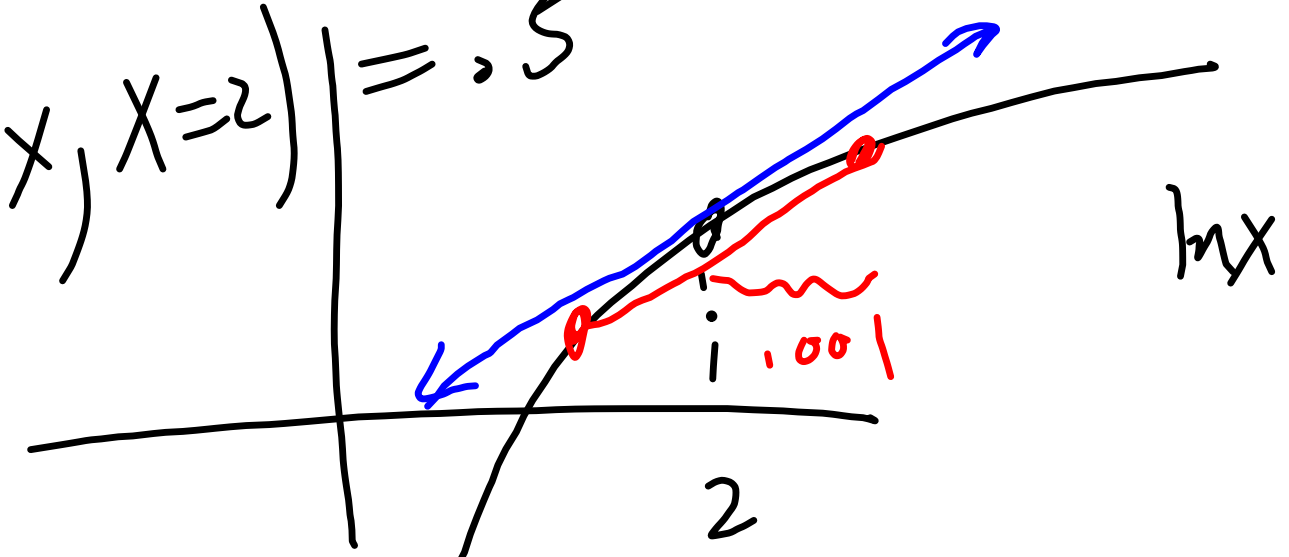
nDeriv(ln(x), X=2, .001)

smaller, more accurate

f(x) = ln(x) approx $f'(2)$

nDeriv = sym. diff quotient

nDer(lnx, X=2) = .5



.5 = slope of red line
≈ slope of blue line